

1447-2554 (On-line)

<https://museumsvictoria.com.au/collections-research/journals/memoirs-of-museum-victoria/>

DOI <https://doi.org/10.24199/j.mmv.2026.85.3>

Four new species and new distributional records for Australian caddisflies in the genus *Ecnomus* McLachlan (Trichoptera: Ecnomidae)

<https://zoobank.org/urn:lsid:zoobank.org:pub:6CDC2C55-5C97-4643-9812-82C8515E5DF5>

DAVID I. CARTWRIGHT

Unit 328/2 Retreat Drive, Buderim, Queensland 4556, Australia [cartwrightd13@gmail.com]
<https://zoobank.org/urn:lsid:zoobank.org:author:B243C38B-6E24-4020-A60A-609ED2161EB7>

Abstract

Cartwright, D.I. 2026. Four new species and new distributional records for Australian caddisflies in the genus *Ecnomus* McLachlan (Trichoptera: Ecnomidae). *Memoirs of Museum Victoria* 85: 135–148.

A recent surge in collection of fresh caddisfly material for molecular studies resulted in the discovery of four new species of *Ecnomus*, the first since a major review of Australian members of the genus by Cartwright in 1990. Three of the new species are from north-eastern Queensland: *E. giblini* sp. nov., *E. lesteri* sp. nov. and *E. mundyi* sp. nov., the latter resulting from recognition that *E. apiculatus* Cartwright, 1990 comprises two distinct species. The fourth new species, *E. barwonensis* sp. nov., also derives from a split from another species, the very similar *E. continentalis* Ulmer, 1916. The new rearrangements are based on small differences in male genitalia supported by divergence in cytochrome oxidase sub-unit 1 gene barcodes. *Ecnomus continentalis* is now recorded only from north-eastern Queensland. All other specimens identified formerly as *E. continentalis*, and mainly from south-eastern Australia, are henceforth assigned to *E. barwonensis* sp. nov. In addition, the Papua New Guinean species *E. iomari* Cartwright, 1998 is recorded from Australia for the first time, and new distributional records are included for 31 further Australian species, some considerably increasing the known ranges of the species. In light of these amendments above, revised descriptions of *E. apiculatus*, *E. continentalis* and *E. iomari* are provided.

Keywords

new species, DNA, COI, Queensland, south-eastern Australia

Introduction

Seven ecnomid genera are recorded from Australia, all of which have been reviewed or described anew over recent years – *Ecnomus* (40 species; Cartwright, 1990), *Daternomina* Neboiss (16 species), *Ecnomina* Kimmins (37 species), *Austrotinodes* Schmid (11 species), *Absensomina* Cartwright (1 species), *Wellsomina* Cartwright (13 species), and *Neboissomina* Cartwright (8 species), in total 126 species (Cartwright et al., 2023).

The global total for *Ecnomus* species numbers about 343, of which about 50% are from the Oriental Region, 28% from the Afrotropical Region, and about 20% in the Australasian Region, with around 1% in other biogeographical regions (Morse, 2026). In Australia, *Ecnomus* larvae are commonly found in lowland rivers, lakes, impoundments and upland streams to an altitude of up to 1920 m. They are predatory and build silken retreats in the crevices of rocks and logs (Suter et al., 2006). No Australian larvae have been described formally, but many species can be separated by small differences in head colour patterns (Cartwright, 1997).

Recent collecting on adventure/four-wheel drive expeditions to many of the more inaccessible areas of Australia, including Cape York (north Queensland), the Kimberley (north Western

Australia) and the Queensland Wet Tropics (north-eastern Queensland), have resulted in the collection of new *Ecnomus* material for DNA/COI analysis and taxonomic study.

Among the four new species discovered, *E. giblini* sp. nov. and *E. lesteri* sp. nov. are from sites near Cairns, north-eastern Queensland and the other two result from recognition that two established species are not monophyletic. *Ecnomus mundyi* sp. nov. results from splitting of *E. apiculatus* Cartwright, 1990, such that *E. apiculatus*, formerly considered a variable species (Cartwright, 1990; figs 71, 71a, 71b), is recorded only from northern Western Australia and the Northern Territory, and specimens from eastern Queensland are now assigned to *E. mundyi* sp. nov. *Ecnomus continentalis* Ulmer, 1916, previously reported to be widespread in eastern Australia, is now recorded only from NE Queensland. All specimens previously recognised as *E. continentalis* from elsewhere (mainly from SE Australia) are assigned to *E. barwonensis* sp. nov.

Ecnomus iomari Cartwright, 1998, described from Papua New Guinea (PNG), is newly recorded for Australia, being the second *Ecnomus* species to be found on both sides of Torres Strait. The widely distributed northern Australian species *E. larakia* Cartwright, 1990 is also recorded from PNG (Cartwright, 1998).

The new taxonomic rearrangements giving rise to recognition of two new species are based on small differences in male genitalia supported by divergence in cytochrome oxidase sub unit 1 gene (COI) barcodes. The north-western Australian specimens of *E. apiculatus* exhibited about 5% COI divergence and small morphological variations from Queensland specimens in the male genitalia. Specimens of *E. continentalis* formed two barcode index number (BIN) taxa (NE and SE Australia) with a COI variation of about 2% (Shackleton et al., in prep); north-eastern Queensland specimens of *E. continentalis* show several small morphological differences from south-eastern Australian specimens in the male genitalia.

Some of the other *Ecnomus* species have very widespread distributions, of up to 3650 km. Two species range across southern or Bassian Australia, namely *E. pansus* Neboiss, 1982 and *E. turgidus* Neboiss, 1982; no differences in morphological characters could be detected between western and eastern Australian populations of both species. However, *E. pansus* formed one BIN clade whilst *E. turgidus* had about 5% COI/BIN divergence between west and east BIN taxa. *Ecnomus tillyardi* Mosely, 1953, widespread in eastern Australia, was recognised previously as a variable species with some hybridisation evident (Cartwright, 1990); this was supported by about 2% COI divergence in BIN specimens between Tasmanian and mainland Australian populations. North-eastern Queensland specimens of *E. wagengugarra* (CT-386/388) showed about 5% difference (from southeast Queensland specimens) in COI divergence, but no obvious morphological variation was discerned (Shackleton et al., in prep).

The new species descriptions plus the new Australian record reported in this study bring the total number of the *Ecnomus* species known in Australia to 45. Many additional distribution records since Cartwright's (1990) revision are also included here, some of which add significantly to the number of specimens or extend the known range of some species. For example, two males of *E. pakadji* Cartwright, 1990 were collected recently, the first specimens since the holotype was collected in 1974, and the range of the north-western Australian species *E. digrutus* Cartwright, 1990 is extended into north-eastern Queensland.

Materials and methods

Depositories for specimens are abbreviated as follows: Museum Victoria, Melbourne (NMV), Australian National Insect Collection, Canberra (ANIC), Queensland Museum, Brisbane, Queensland (QM), the Natural History Museum, London (BMNH) and Naturhistoriska Riksmuseet, Stockholm (NRS). All specimens, including types, mentioned in the text are lodged in the NMV unless stated otherwise.

Male and female genitalia were cleaned in potassium hydroxide (KOH) to assist in identification of genitalic structures. Females were paired with respective males based on similarities in size, colouration, wing venation and locality; a few were linked via DNA (COI) sequence analysis. Figured specimens are identified by the notebook numbers of the author (prefix CT-). Figures were drawn using a grid graticule in the eyepiece of a stereomicroscope and transcribed to graph paper and inked on tracing paper.

Leg samples of some specimens were sent to the Biodiversity of Life Database (BOLD) (<http://www.boldsystems.org>) for COI sequencing and have been allocated DC- numbers by the author and a BOLD BIN number. Information on the methods used for sequencing and gene segment sequenced are available on the BOLD website.

Terminology generally follows that of Cartwright (1990) and Li and Morse (1997). Terminology used for genitalia is indicated on figures. Length and width or height ratios generally refer to the maximum length divided by maximum width or height.

Abbreviations used for Australian states and territories are as follows: New South Wales (NSW), Northern Territory (NT), Queensland (Qld), Tasmania (Tas) and Victoria (Vic). Regions are abbreviated as follows: central (C), eastern (E), southern (S), western (W) and combinations of these (e.g. southeastern (SE)).

Taxonomy

Genus *Ecnomus* McLachlan 1864

Type species. Philopotamus tenellus Rambur, 1842 by monotypy.

The genus in Australia is represented by 40 species (Cartwright, 1990). Four new species, a new species record for Australia is given and additional new distributional records are listed for a further 31 species.

Ecnomus barwonensis sp. nov.

(figs 1, 2)

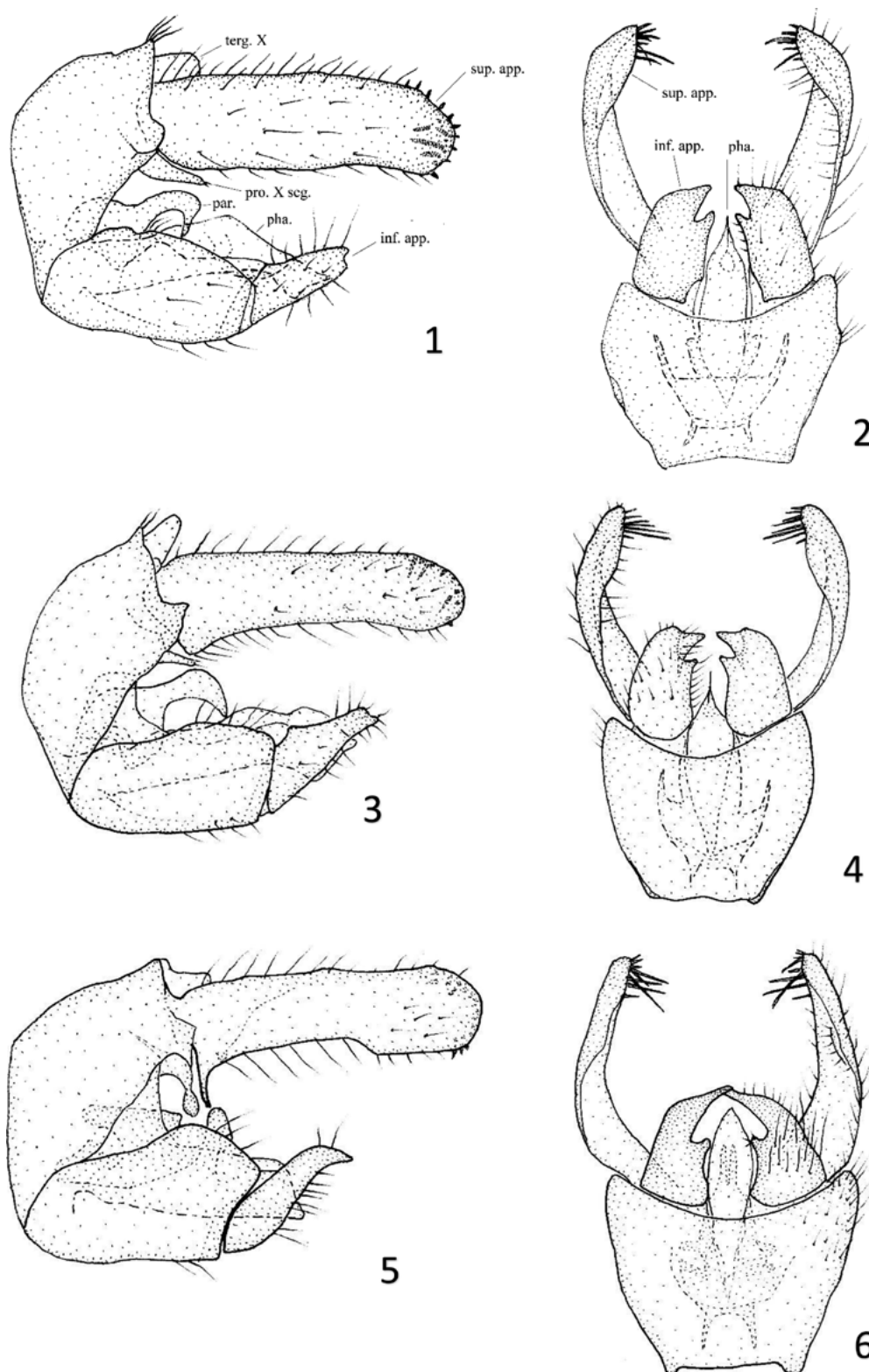
<https://zoobank.org/urn:lsid:zoobank.org:act:A1EE3923-84AD-4EC3-B05B-18807A471C23>

Previously identified as *E. continentalis* Ulmer, 1916: 10, figs 12–14.—Mosely and Kimmins, 1953: 380, fig. 261.—Neboiss, 1978: 830, figs 10, 11.—Neboiss, 1982: 286, figs 16, 17.—Cartwright, 1990: 17, figs 45, 46, 93, 94.

Material examined. Holotype male (DC 247, specimen CT-742 figured), Vic, Barwon River, Merriwar Rd, W of Geelong, 38° 14' S, 144° 26' E, 18 Nov 2013, D. Cartwright (NMV, TRI-57937).

Paratypes. 1 male, Victoria: Barwon R., Merriwar Rd, W of Geelong, UV light, 38° 14' S, 144° 26' E, 24 Oct 2019, D. Cartwright (NMV TRI-58581); 1 male, 2 females, same loc. and coll., 14 Dec 2020 (NMV TRI-58528); 2 males, 1 female, same loc. and coll., 6 Dec 2021 (NMV TRI-57947); 1 male, same loc. and coll., 18 Feb 2021 (NMV TRI-57950); 2 males, same loc. and coll., 17 Mar 2022 (NMV TRI-58526); 3 males, same loc. and coll., 27 Dec 2022 (NMV TRI-57942); 3 males, same loc. and coll., 1 Jan 2023 (NMV TRI-57944); 1 male, same loc. and coll., 10 Nov 2023 (NMV TRI-57943); 1 male, same loc. and coll., 3 Feb 2025 (NMV TRI-58588).

Other material examined. Queensland. 12 males (CT-747), Carnarvon Gorge, Nat. Park, 25° 15' S, 148° 24' E, 12 Nov 1990, G. Theischinger (NMV TRI-57900); 2 males, Conondale Ra., Booloomba Ck, 1–3 Dec 1985, C. Cassis and D. Bickel (NMV TRI-58578); 1 male, Morans Ck u/s Morans Falls, Lamington NP, 28.2261° S, 153.1286° E, 16 Nov 2011, J. Mynott and M. Shackleton (NMV TRI-58584). New South Wales. 1 male, 1 female, Wilson R. nr Bellangry, 5 Dec 1988, G. Theischinger (NMV TRI-57903); 3 males, 4 females, Barrington R., Rocky Crossing, W Barrington Rd, 32° 02' S, 150° 52' E, 30 Sep 2008, J. Dean and D. Cartwright (NMV TRI-58583); 1 male, Barrington R.



Figures 1–6. *Ecnomus* species, male genitalia. 1–2, *E. barwonensis* sp. nov. (Vic. Barwon R.; Holotype, CT-742, NMV TRI-57937). 1, lateral 2, ventral. 3–4, *E. continentalis* Ulmer, 1916 (Qld, creek, Kirrama Range Rd, CT-731, NMV TRI-58537). 3, lateral 4, ventral. 5–6, *E. lesteri* sp. nov. (Qld, trib. Of Tully R., Paratype, CT-671, NMV TRI-57881). 5, lateral 6, ventral. Abbreviations inf. app., inferior appendage; par., paramere; pha., phallus; pro. X seg., process on tenth abdominal segment; s.a., superior appendage; terg. X, tenth abdominal segment.

u/s Gloucester R., 30 Sep 2008, D. Cartwright (NMV TRI-57906); 11 males (CT-748), 8 females, Allyn R. by the Allyn Riverside Cabins, 32.1879° S, 151.5029° E, 6–7 Nov 2018, Z. Billingham (NMV TRI-57907/58582); 4 males, 5 females (DC 069), Wollombi Brook, The Basin, Olney St. Forest, 33° 06' S, 151° 14' E, 4 Oct 2008, J. Dean and D. Cartwright (NMV TRI-57904/57909/58337); 1 male, Genoa R., 1.5 km along Imlay Rd, 37° 08' S, 149° 21' E, 2 Feb 2012, D. Cartwright (NMV TRI-58580). Victoria. 1 male, Genoa R., Wangarabell, 22 Oct 1988, DC (NMV TRI-57908); 6 males, 3 females, Back Ck, trib. Cann R., Noorinbee N, UV lt, 10 Dec 2003, D. Cartwright (NMV TRI-57910); 2 males, Tallangatta Ck at Campbells Rd, 36° 17.75' S, 147° 23.76' E, 7 Jan 2010, M. Shackleton (NMV TRI-58587); 6 males, Avon R. u/s McColls track, 1 Apr 2004, J. Dean (NMV TRI-58585); 1 female (CT-091), Mitchell R. nr Tabberabbera, 30 Dec 1975, collector unknown (NMV TRI-57901); 5 males, Hughes Ck, site 4, light trap, 6–7 Jan 2015, J. Lancaster and B. Downes (NMV TRI-58207); 10 males, Coliban R. nr Lauriston, W of Kyneton, 37.2390° S, 144.3713° E, 25 Jan 2021, D. Cartwright (NMV TRI-57949); 1 male, Kyneton Bushland Resort, lake, 37.2202° S, 137.4419° E, 31 Jan 2020, D. Cartwright (NMV TRI-58530); 2 males, Yea R., Glenburn, 29 Nov 2007, D. Cartwright (NMV TRI-57902); 2 males, Yea R., Westbridge Rd, 4.8 km S Glenburn, 29 Nov 2007, D. Cartwright (NMV TRI-58579); 4 males, 1 female, Grace Burn, Wallace Pde, UV lt, 2 Dec 2003, D. Cartwright (NMV TRI-58586); 1 male (DC 268), Yarra R. nr Yering Gorge, 37° 42' S, 145° 33' E, 27 Nov 2013, D. Cartwright (NMV TRI-58524).

Diagnosis. *Ecnomus barwonensis* sp. nov. is most similar to *E. continentalis* and *E. kerema* Cartwright, 1990 in possessing apical and subapical processes on the inferior appendages, which are narrowly separated. *Ecnomus barwonensis* sp. nov. can be separated from the latter two by the superior appendages without downwardly produced or angular basiventral angle and the inferior appendages being more gradually tapered posteriorly in lateral view. The male of *E. barwonensis* sp. nov. has superior appendages in lateral view with length divided by width at midlength equal to about 2.3, whereas for *E. continentalis* this ratio is about 4 and *E. kerema* about 5.

Description. Head, body and wings brown.

Wings similar to *E. pansus* (Neboiss, 1982, fig. 22) and *E. veratus* (Cartwright, 1990, fig. 9). Length of each forewing: male 5.2–5.9 mm (n=3).

Male. Genitalia with superior appendages elongate and laterally compressed, with group of stout, dark spines meso-posteriorly (figs 1, 2); in lateral view, subrectangular, length about 2.3 times mid-length width, without downwardly produced basiventral angle, rounded posteriorly (fig. 1). Phallus generally tube-like, tapered posteriorly (figs 1, 2), in lateral view, angled downwards near middle, obliquely narrowed subapically (fig. 1). Parameres in lateral view, curved downwards apically at greater than right angles to form a distinct hook (fig. 1). Inferior appendages stoutly subrectangular, dorsoventrally compressed (figs 1, 2); in lateral view, length about 2.5 times width, appear slightly truncate distally (fig. 1); in ventral view, length nearly twice width, with mesal digitiform projection situated subapically, forming a narrow cleft (fig. 2).

Female. Unknown.

Etymology. *Barwonensis* – named for type locality (Barwon River).

Remarks. This new species was previously identified as *E. continentalis*, which was listed as a very common and widespread species, ranging from eastern Qld to Vic, SA and southern NT (Cartwright, 1990).

Distribution. The recognition of *E. barwonensis* sp. nov. means *E. continentalis* is now recorded only from NE Qld (latitudinal range 11° 45' S to about 21° S); the distribution of *E. barwonensis* sp. nov. is in all remaining areas south of 24° S (to about 38° S).

Ecnomus continentalis Ulmer, 1916

(figs 3, 4)

Ecnomus continentalis Ulmer, 1916: 10, figs 12–14.—Mosely and Kimmins, 1953: 380, fig. 261.—Neboiss, 1978: 830, figs 10, 11.—Neboiss, 1982: 286, figs 16, 17.—Cartwright, 1990: 17, figs 45, 46, 93, 94.

Material examined. Type male. Lectotype male (designated by Neboiss, 1982), Qld, Malanda, date unknown, Mjöberg (NRS). Type not seen.

Other material examined. Queensland. 2 males, Heathlands, 11° 45' S, 142° 35' E, 25 Apr–7 Jun 1992, Malaise, T. McLeod (ANIC); 1 male, same site, 25 Jul–18 Aug 1992, Malaise, P. Zborowski and J. Cardale (ANIC); 1 male (CT-727), trib. Freshwater Ck, Crystal Cascades carpark, 16.962° S, 145.68° E, 22 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-58532); 2 males, pool on Freshwater Ck, 200 m u/s Crystal Cascades carpark, 16.963° S, 145.677° E, 23 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-57897); 2 males, Currunda Ck, Redlynch Connection Rd, 2.5 km d/s Crystal Cascades carpark, 16.935° S, 145.692° E, 23 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-57894); 2 males, Lake Placid, 100 m u/s Barron R. outlet, 16.8681° S, 145.673° E, 31 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-57896); 1 male (CT-729), jn of trib. and Mulgrave R., Goldsborough Valley camp, Wooroorooran NP, 17.2403° S, 145.774° E, 26 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-58531); 1 female, Milla Milla Falls below waterfall, Atherton Tablelands, 17.495° S, 145.6105° E, 13 May 2010, J. Webb and M. Shackleton (NMV TRI-57899); 1 male, Rocky Ck, NW of Tully on Tully Gorge Rd, 17.9248° S, 145.8773° E, 21 Oct 2017, D. Cartwright (NMV TRI-57898); 1 male, Douglas? Ck, Bridge 10, Kirrama Range Rd, approx. 13 km from NP sign, 18.1955° S, 145.87° E, 720 m, 25 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-57895); 1 male (specimen CT-731/DC389 figured), creek at Bridge 1, Kirrama Range Rd, 0.5 km from NP sign, 18.2029° S, 145.886° E, 24 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-58537); 1 male (CT-726), Dunn? Ck, Bridge 11, Kirrama Range Rd, approx 14 km from NP sign, 18.2138° S, 145.798° E, 765 m, 24 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-58534).

Diagnosis. *Ecnomus continentalis* is most similar to *E. barwonensis* and *E. kerema*, from which it can be separated by the combination of superior appendages with downwardly produced basiventral angle and the inferior appendages strongly tapered posteriorly in lateral view.

Description. (Revised after Ulmer, 1916; Neboiss, 1982; Cartwright, 1990). Head, body and wings mid to light brown.

Wings similar to *E. pansus* (Neboiss, 1982, fig. 22) and *E. veratus* (Cartwright, 1990, fig. 9). Length of each forewing: male 4.3–4.6 mm (n=3).

Male. Genitalia with superior appendages elongate and laterally compressed, with group of stout, dark spines meso-

posteriorly (figs 3, 4); in lateral view, subrectangular, length about four times median width, with downwardly produced basiventral angle, apices rounded posteriorly. Phallus generally tube-like, slightly laterally compressed, tapered posteriorly (figs 3, 4), in lateral view, slightly bulbous subapically (fig. 3). Parameres in lateral view, curved downwards at right angles apically or slightly obtuse angle to form a distinct hook (fig. 3). Inferior appendages stout, robust, dorsoventrally compressed (figs 3, 4); in lateral view, subtriangular, tapered strongly posteriorly, appear slightly truncate distally (fig. 3); in ventral view, length about 1.6–1.7 times width, with mesal digitiform projection situated subapically (fig. 4).

Female. See Cartwright (1990: 18, figs 93, 94).

Remarks. *Ecnomus continentalis* has had a jumbled history since its description by Ulmer (1916). Mosely and Kimmins (1953, fig. 261) mistakenly figured *E. pansus* (later described by Neboiss, 1982) and Neboiss (1978, figs 10, 11) figured *E. cygnitus* (also later described by Neboiss, 1982), instead of Ulmer's *E. continentalis*. These errors were corrected by Neboiss (1982) when he designated a lectotype for *E. continentalis* and formally described *E. pansus* and *E. cygnitus*.

Ulmer's (1916), Neboiss's (1982) and Cartwright's (1990) figures are combined to give new figures, enabling direct comparisons, and to accompany the description that is revised in light of new interpretations of *E. continentalis* genitalic structures.

Distribution. *Ecnomus continentalis* was known as a very common and widespread species, recorded from eastern Qld to Vic, SA and southern NT (Cartwright, 1990), but with the new description of *E. barwonensis* from SE Australia is now restricted to NE Qld (latitudinal range 11° 45' S to about 21° S).

Ecnomus lesteri sp. nov.

(figs 5, 6)

<https://zoobank.org/urn:lsid:zoobank.org:act:7E9545CA-250D-4A89-9AE0-61BCD2E6F8C1>

Material examined. Holotype male (CT-744), Queensland, Trib. of Tully R. on Tully Gorge Rd, 45 km NW of Tully, 17.7584° S, 145.6340° E, 2 Nov 2017, D. Cartwright and R. St Clair (NMV TRI-57880).

Paratypes. Queensland: 1 male (specimen CT-671 figured). Trib. of Tully R. at Bridge 18, Tully Gorge Rd, 49 km NW of Tully, 17.7557° S, 145.6273° E, 2 Nov 2017, D. Cartwright and R. St Clair (NMV TRI-57881); 9 males, Mulgrave R., Goldsborough Valley campsite, Wooroonooran NP, 17.2374° S, 145.7733° E, 26 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-57882/57883/57884).

Diagnosis. *Ecnomus lesteri* is most similar to *E. turgidus* and *E. digrutus* Cartwright, 1990 in having a digitiform projection basiventrally on the superior appendages (fig. 5), but can be separated from the latter two by the shape of the superior appendages in lateral view, which are broad-based and taper posteriorly in *E. turgidus* and *E. digrutus* but in *E. lesteri* sp. nov. are relatively narrow basally and dilated posteriorly (fig. 5).

Description. Head, body and wings light brown.

Wings similar to *E. veratus* (Cartwright, 1990, fig. 9). Length of each forewing: male 4.7–4.8 mm (n=3).

Male. Genitalia with superior appendages laterally compressed, with group of dark spines meso-apically (figs 5, 6); in lateral view, subrectangular, with slender digitiform projection basomesoventrally, dilated slightly in distal third, rounded apically (fig. 5). Phallus generally tube-like, slightly laterally compressed, tapered posteriorly (figs 5, 6); with fused, platelike parameres dorsally (fig. 5). Inferior appendages strongly dorsoventrally compressed, apices acute (figs 5, 6); in lateral view, appear slender, slightly sinusoidal, length about four times width (fig. 5) and in ventral view, robust in basal half, tapered strongly distally with a short mesal projection near mid-length, apices angled mesally (fig. 6).

Female. Unknown.

Etymology. Named for Peter Lester, who has chauffeured me on many four-wheel drive adventures and collecting trips around Australia.

Distribution. Eleven specimens of *Ecnomus lesteri* have been collected from three sites in NE Qld (latitudinal range 17.2–17.8° S).

Ecnomus giblini sp. nov.

(figs 7, 8)

<https://zoobank.org/urn:lsid:zoobank.org:act:B2C1C965-4FC1-4B14-A2DB-4103BDD8C984>

Material examined. Holotype male, Qld, Mulgrave River, Goldsborough Valley campsite, Wooroonooran NP, 17.2374° S, 145.7733° E, 26 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-57885).

Paratypes. Queensland. 1 male (specimen CT-683 figured), collected with holotype (NMV TRI-57886); 1 male, pool on Freshwater Ck, 200 m u/s Crystal Cascades carpark, 16.963° S, 145.677° E, 23 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-57887).

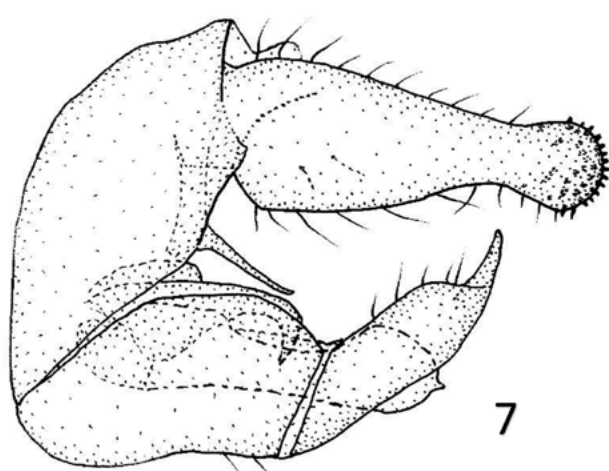
Diagnosis. *Ecnomus giblini* sp. nov. is most similar to *E. apiculatus* Cartwright and *E. mundyi* sp. nov., from which it can be separated by the shape of the inferior appendages, which are more slender and smoothly tapered posteriorly in ventral view.

Description. Head, body and wings light brown.

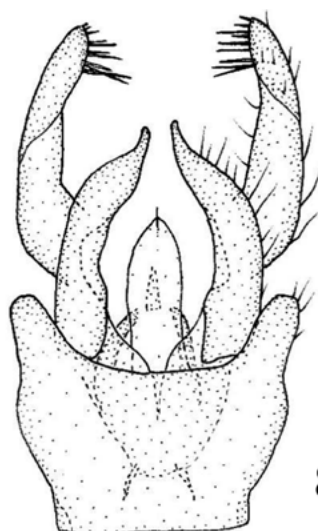
Wings similar to *E. veratus* (Cartwright, 1990, fig. 9). Length of each forewing: male 3.9–4.1 mm (n=3).

Male. Genitalia with superior appendages long and laterally compressed, with group of stout, dark spines mesoposteriorly (figs 7, 8); in lateral view, broadest in basal half, tapered posteriorly, length about 2.5 times width, narrowed subapically, apices rounded posteriorly. Phallus generally tube-like, in lateral view, slightly bulbous subapically (fig. 7). Parameres in lateral view, curved downwards at right angles apically forming a hook (fig. 7). Inferior appendages slender, apices digitiform (figs 7, 8); in lateral view, appear somewhat trapezoid shaped, length about four times width, dorsal subapical angle obtuse (fig. 7); in ventral view, length about four times width, outer margin curved, tapered gradually posteriorly (fig. 8).

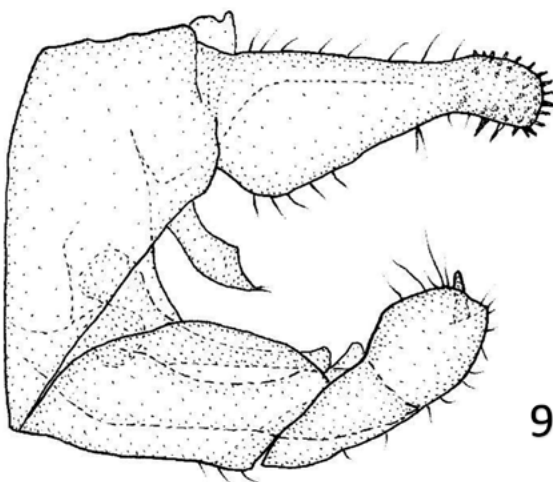
Female. Unknown.



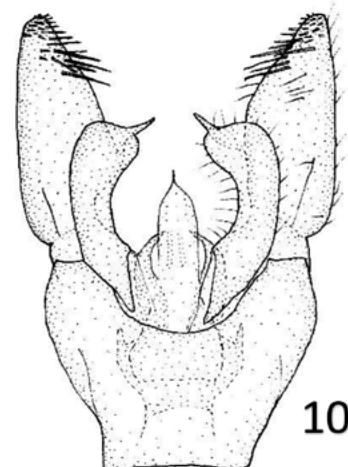
7



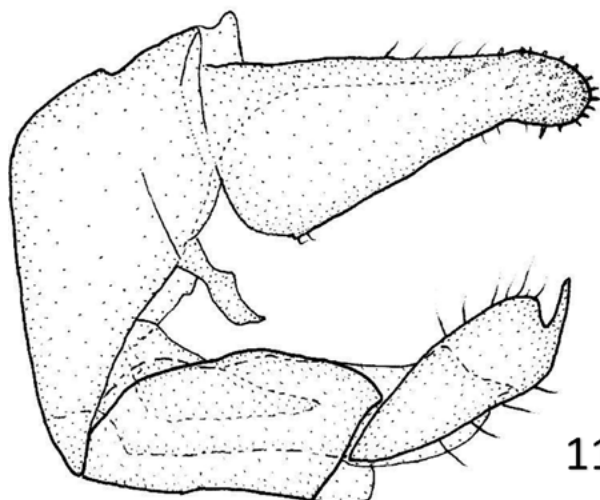
8



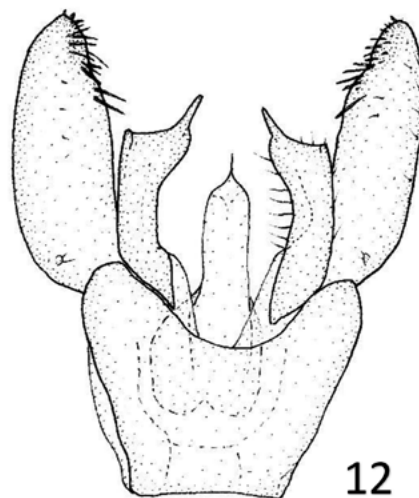
9



10



11



12

Figures 7–12. *Ecnomus* species, male genitalia. 7–8, *E. giblini* sp. nov. (Qld, Mulgrave R., Paratype, CT-683, NMV TRI-57886). 7, lateral 8, ventral. 9–10, *E. mundyi* sp. nov. (Qld, Barron R., Cairns, Paratype, CT-725, NMV TRI-57889). 9, lateral 10, ventral. 11–12, *E. apiculatus* Cartwright 1990 (CT-739, NMV TRI-57892). 11, lateral 12, ventral.

Etymology. Named for Jeff Giblin, a friend who has facilitated many of my four-wheel drive adventures and collecting trips around Australia for over 40 years.

Remarks. Three male specimens of *E. giblini* sp. nov. have been collected from two sites in NE Qld (latitudinal range 17–17.2° S).

***Ecnomus mundyi* sp. nov.**

(figs 9, 10)

<https://zoobank.org/urn:lsid:zoobank.org:act:BACE9ED3-6501-426F-BEC1-4C16A25743EC>

Previously identified as *E. apiculatus* Cartwright, 1990: 23, figs 71b, 72.

Material examined. Holotype male, Qld, Lake Placid, 100 m u/s Barron R. outlet, 16.86815° S, 145.6727° E, 31 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-57888).

Paratype. Queensland. 3 males (specimen CT-725 figured; CT-733), Barron R., Lake Placid outlet, Cairns, 16.8689° S, 145.462° E, 30 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-57889/57890).

Diagnosis. *Ecnomus mundyi* sp. nov. is most similar to *E. apiculatus* in the shape of the inferior appendages in ventral view, from which it can be separated by the shape of the inferior appendages in lateral view, which appear robust, bulbous subapically.

Description. Head, body and wings light brown.

Wings similar to *E. veratus* (Cartwright 1990, fig. 9). Length of each forewing: male 3.9–4.0 mm (n=2).

Male. Genitalia with superior appendages long and laterally compressed, with group of stout, dark spines mesoposteriorly (figs 9, 10); in lateral view, broadest in basal half, tapered posteriorly, length about twice width, narrowed subapically, apices rounded posteriorly. Phallus generally tube-like, slightly laterally compressed, tapered posteriorly (figs 9, 10), in lateral view, dilated subapically (fig. 9). Parameres in lateral view, appear relatively straight, rod-like (fig. 9); in ventral view apices slightly incurved, appear acute (fig. 10). Inferior appendages robust, apices digitiform (figs 9, 10); in lateral view, appear bulbous and broadest in posterior half, tapered basally, length about 2.5 times maximum width, (fig. 9); in ventral view, length about three times maximum width, outer margin curved, narrowed near middle (fig. 10).

Female. Unknown.

Etymology. Named for Wayne Mundy, a friend who for over 40 years has been my driver on many of my four-wheel drive adventures and collecting trips around Australia.

Remarks. The four male specimens from near Cairns, plus six specimens from near Brisbane (Cartwright, 1990) are now assigned to this new species. This species was previously included within *E. apiculatus*, which was listed as a variable species (Cartwright, 1990; figs 71, 71a, 71b), found across northern WA, NT and SE Qld (Cartwright, 1990). The description of the new species, *E. mundyi* sp. nov. from eastern Qld (latitudinal range 16.9–27.5° S) means *E. apiculatus* is now restricted to northern WA and the NT.

***Ecnomus apiculatus* Cartwright, 1990**

(figs 11, 12)

Ecnomus apiculatus Cartwright, 1990: 23, figs 71, 72.

Material examined. Holotype male, WA, Ord River, 9 km N Kununurra, 19 Sep 1979, J. Blyth (NMV, T-10213).

Other material examined. Western Australia. 2 males (specimen CT-739 figured; CT-740), Kimberley, Kununurra, Kimberleyland Caravan Park, lake foreshore, 16 Aug 2011, D. Cartwright (NMV TRI-57891/57892); 1 male, Argyle Dam spillway, 7 May 1992, P. Cranston and P. Gullen (NMV TRI-57893).

Diagnosis. *Ecnomus apiculatus* appears most similar to *E. giblini* in the subrectangular shape of the inferior appendages in lateral view and to *E. mundyi*, in the shape of the inferior appendages in ventral view. *Ecnomus apiculatus* can be separated from *E. giblini* by the absence of the smoothly tapered inferior appendages subapically in ventral view and from *E. mundyi* by lacking the somewhat bulbous inferior appendages in lateral view.

Description. (Revised after Cartwright, 1990). Head, body and wings light brown.

Wings similar to *E. veratus* (Cartwright, 1990, fig. 9). Length of each forewing: male 3.0–4.3 mm.

Male. Genitalia with superior appendages long and laterally compressed, with group of stout, dark spines mesoposteriorly (figs 11, 12); in lateral view, broadest in basal half, tapered posteriorly, length about 2.2 times width, narrowed subapically, apices rounded posteriorly. Phallus generally tube-like, slightly laterally compressed, tapered posteriorly (figs 11, 12), in lateral view, slightly dilated subapically (figs 11, 12). Parameres in lateral view, hard to discern, directed posteriorly (figs 11, 12). Inferior appendages slender, apices digitiform (figs 11, 12); in lateral view, appear semi-rectangular, broadest in posterior half, length about three times width, tapered slightly basally, dorsal subapical angle appears near a right angle (fig. 11); in ventral view, length about three times width, outer margin straight, angled sharply subapically, inner margin slightly concave near middle (fig. 11).

Female. Unknown.

Remarks. *Ecnomus apiculatus* was previously listed as a variable species, found across northern Australia (Cartwright, 1990), but with the description of the new species *E. mundyi* from Qld, *E. apiculatus* is now restricted to WA and the NT (latitudinal range 15.7–17.4° S).

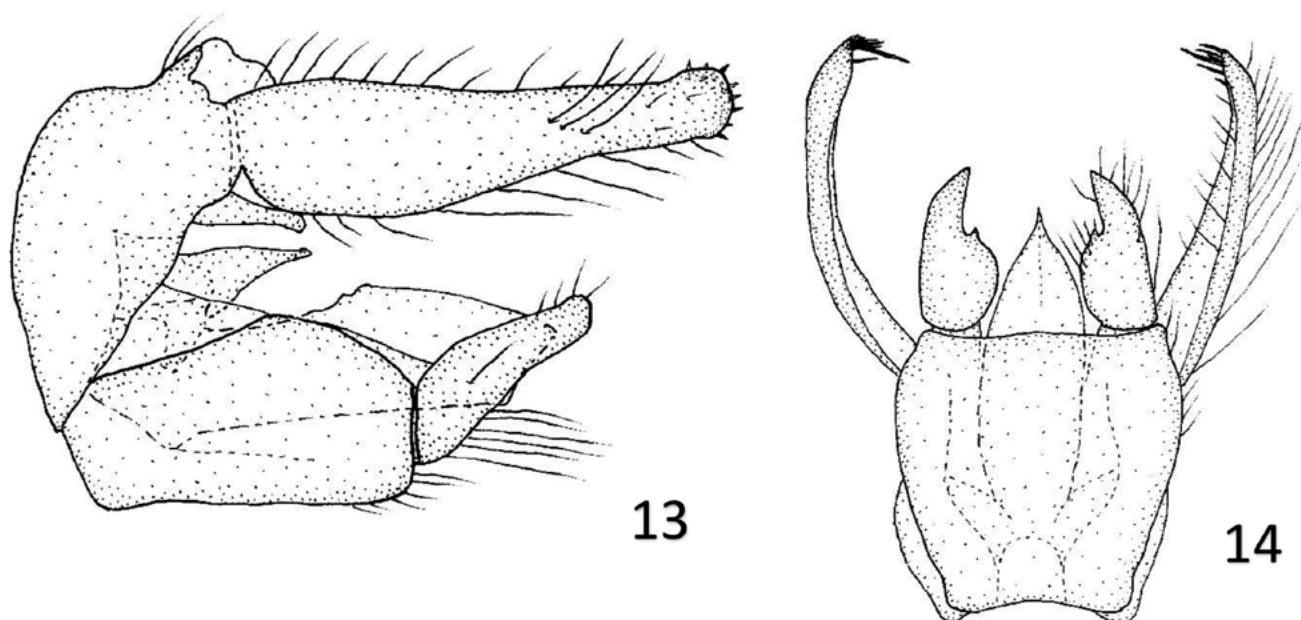
***Ecnomus iomari* Cartwright, 1998**

(figs 13, 14)

Ecnomus iomari Cartwright, 1998: 85, figs 39, 40

Material examined. Holotype male, Papua New Guinea, Central Province, Iomari Ck, Bereima–Port Moresby Rd, UV light, 23 May 1986, A. Wells and J. Ismay (NMV, T-16799).

Other material examined. 1 male (specimen CT-634 figured), Australia, Qld, Cape York Peninsula, Wenlock R., Morton Telegraph Stn, 4 Aug 2009, D. Cartwright (NMV TRI-57938).



Figures 13–14. *Ecnomus* male genitalia in lateral and ventral views. Figs 13–14, *E. iomari* Cartwright (Qld, Wenlock R., CT-634, NMV TRI-57938). 13, lateral 14, ventral.

Diagnosis. *Ecnomus iomari* can be distinguished from other Australian (and PNG) species by the combination of the slightly tapered superior appendages and the simple and slender parameres.

Description. (Revised after Cartwright, 1998). Head, body and wings light brown.

Wings similar to *E. veratus* (Cartwright, 1990, fig. 9). Length of each forewing: male 3.4–3.9 mm (Cartwright, 1998).

Male. Genitalia with tergum X membranous. Superior appendages laterally compressed with group of stout, dark spines mesoposteriorly (figs 13, 14); in lateral view, length about 3.7 times width, broadest in basal half, tapered in posterior half, rounded apically. Phallus generally robust, tube-like, in lateral view obliquely dilated in posterior half; with a single process (phallic guide) arising from near the base of the inferior appendages (fig. 13). Inferior appendages short, broadest in basal half, tapered slightly posteriorly with brush of relatively long hairs basally (mostly lost with time in alcohol) (figs 13, 14); in lateral view length about 3.4 times width (fig. 13).

Female. Unknown.

Remarks. *Ecnomus iomari* was originally described from central and NE PNG (Cartwright, 1998). A single specimen of this very distinctive species with very long hairs on the genitalia (most hairs have detached with time in alcohol) is recorded from Australia for the first time a few hundred kilometres south of the type locality (latitude 12.45° S). No long hairs were mentioned or illustrated for the type specimen. The Qld specimen differs from the type specimen in that the inferior appendages are slightly more slender, particularly in lateral view (fig. 13).

New distribution records

Ecnomus ancisus Cartwright

Ecnomus ancisus Cartwright, 1990: 18, figs 49, 50.

Holotype male. Western Australia. Ord R. below dam, 21 Feb 1977, J.E. Bishop (NMV, T-10170).

New material examined. Western Australia. 1 male, Kimberley, King Edward R., 14° 52.57' S, 126° 12.08' E, 4–5 May 1992, P.S. Cranston (NMV TRI-57871).

Remarks. This species was previously recorded from the Kimberley Region of WA and the northern NT (Cartwright, 1990).

Ecnomus bicornis Cartwright

Ecnomus tropicus Cartwright, 1990: 23, figs 69, 70; *Ecnomus bicornis* Cartwright, 2011: 12, nom. nov.

Holotype male. Queensland. Upper Ross R., below weir, SW of Townsville, 8 May 1979, A. Wells (NMV, T-10204).

New material examined. Western Australia. 2 males, Backsten Ck, S of Prince Regent Res., 16° 00' S, 125° 29' E, 6 Sep 1996, I. Edwards (NMV TRI-57870); 1 male, Pearsons Ck, S edge of Prince Regent Res., 16° 01' S, 125° 35' E, 5 Sep 1996, I. Edwards (NMV TRI-57866); 7 males, El Questro Stn, Chamberlain R. pool, 15° 58' S, 127° 56' E, 26 Aug 1996, I. Edwards (NMV TRI-57875).

Remarks. This species was previously recorded from northern Qld, NT and the Kimberley Region of WA (Cartwright 1990).

Ecnomus bishopi Cartwright

Ecnomus bishopi Cartwright, 1990: 13, figs 28, 29.

Holotype male. Western Australia. Spillway Ck, Ord River Dam, 20 Feb 1977, J.E. Bishop (NMV, T-10095).

New material examined. Western Australia. 2 males (DC 095), Pilbara, De Grey R., Great Northern Hwy Bridge, 20° 18' S, 119° 15' E, 6 Sep 2007, D. Cartwright and J. Giblin (NMV TRI-58292/TRI-58349); 2 males, Purnululu NP, Blue Holes, Ord R., 17° 33' S, 128° 15' E, 7 Oct 1996, I. Edwards (NMV TRI-57872). Northern Territory. 1 male, Negri R., Duncan Hwy, 17° 05' S, 129° 01' E, 18 Aug 2007, D. Cartwright and J. Giblin (NMV TRI-58282).

Remarks. This species was previously recorded from the Kimberley Region of WA (Cartwright, 1990). The range is now extended to the northern Pilbara Region of WA and western NT.

Ecnomus blythi Cartwright

Ecnomus blythi Cartwright, 1990: 19, figs 51, 52

Holotype male. Western Australia. Northern Territory. Jasper Ck, Victoria River Downs Rd, 45 km SSE Timber Ck, 17 Sep. 1979, J. Blyth (NMV, T-10173).

New material examined. Western Australia. 1 male, Purnululu NP, Blue Holes, Ord R., 17° 33' S, 128° 15' E, 7 Oct 1996, I. Edwards (NMV TRI-58289).

Remarks. This species was previously recorded from the Kimberley Region of WA and the north of the NT (Cartwright, 1990).

Ecnomus clavatus Cartwright

Ecnomus clavatus Cartwright, 1990: 13, figs 30, 31.

Holotype male. Northern Territory, Lambells Lagoon, Humpty Doo, 19 Aug 1979, J. Blyth (NMV, T-10096).

New material examined. Western Australia. 1 male, Drysdale R. NP via Carson River Stn, 14° 37' S, 126° 56' E, 31 Aug 1996, I. Edwards (NMV TRI-58274); 1 male, King Edward R., 14° 54' S, 126° 12' E, 3 Sep 1996, I. Edwards (NMV TRI-58273); 1 male, El Questro Stn, Chamberlain R., pool, 15° 58' S, 127° 56' E, 26 Aug 1996, I. Edwards (NMV TRI-57874); 2 males, Purnululu NP, Blue Holes, Ord R., 17° 33' S, 128° 15' E, 7 Oct 1996, I. Edwards (NMV TRI-57863). Northern Territory. 3 males, Cooida, Kakadu NP, 12° 54' S, 132° 31' E, 11 Aug 1996, I. Edwards (NMV TRI-57867).

Remarks. This widespread species was previously recorded from the Pilbara and Kimberley Regions of WA, NT and eastern Qld (Cartwright, 1990).

Ecnomus cuspidis Cartwright

Ecnomus cuspidis Cartwright, 1990: 12, figs 26, 27.

Holotype male. Queensland, Upper Ross River below weir, SW of Townsville, 8 May 1979, A. Wells (NMV, T-10091).

New material examined. Queensland. 1 male, Bamaga (ex *Culicoides* trap), 26 Mar 2009, J. Bond (ANIC); 1 male, Kowanyama (ex *Culicoides* trap, airport camp site), Cape York Peninsula, 27–31 Oct 2008, A. Pootle (ANIC); 1 male, Kendall R. stn via Cairns (ex *Culicoides* trap), 4–6 Oct 2008?, T. Kerlin and B. Cookson (ANIC); 1 male (DC 053), N Kennedy R. nr Hann R. xing, Lakefield NP, 13 Aug 2009, D. Cartwright (NMV TRI-58345); 1 male (CT-724/DC 370), Currunda Ck, Redlynch Connection Rd, 2.5 km d/s Crystal Cascades carpark, 16.935° S, 145.692° E, 24 m, 23 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-57918). Western Australia. 3 males, Pilbara,

De Grey R., Great Northern Hwy bridge, 20° 18' S, 119° 15' E, 6 Sep 2007, D. Cartwright and J. Giblin (NMV TRI-58285/58294).

Remarks. This is a slightly variable species, found across eastern Qld, NT and northern WA (Cartwright, 1990) and, recently, from the northern Pilbara region of WA.

Ecnomus cygnitus Neboiss

Ecnomus cygnitus Neboiss, 1982: 288, figs 32, 33, 99,100;—Cartwright, 1990: 16, figs 41, 42, 89,90;—Neboiss, 2002 (2003): 63, figs 14A–C, 15c, d.

Holotype male. Swan Lake, 30 km NW of Portland, 27 Feb 1976, P. A. Meyer (NMV, T- 6670).

New material examined. Victoria. 1 male, Yarra R., OShannassy Rd, 1 Dec 2005, D. Cartwright (NMV TRI-58228); 4 males, Bobs Pond, 4.5 km W of Emerald, 25 Oct 1984, D. Cartwright (NMV TRI-58211); 10 males, Campaspe R., S of Kyneton, 37.2554° S, 144.4535° E, 23 Jan 2021, D. Cartwright (NMV TRI-57954); 7 males, Coliban R. nr Lauriston, W of Kyneton, 37.2390° S, 144.3713° E, 25 Jan 2021, D. Cartwright (NMV TRI-57948); 1 male (DC 243), Barwon R., Merriwarp Rd, W of Geelong, 38° 14' S, 144° 26' E, 18 Oct 2013, D. Cartwright (NMV TRI-58361); 4 males, same loc., 24 Oct 2019, D. Cartwright (NMV TRI-58218); 2 males, same loc., 18 Feb 2021, D. Cartwright (NMV TRI-57960); 7 males, Barwon R., Ring Rd bridge, W of Geelong, 38.1517° S, 144.2953° E, 9 Jan 2020, D. Cartwright (NMV TRI-58525). Tasmania. 1 male, Adams R. at Adams falls, 42° 43' S, 146° 18' E, MV-light, 8 Feb 1988, A. Neboiss and K. Walker (NMV TRI-58307).

Remarks. A common, widespread and slightly variable species found in eastern Qld, eastern NSW, Vic, Tas and SE SA (Cartwright, 1990).

Ecnomus deani Cartwright

Ecnomus deani Cartwright, 1990: 14, figs 21–23.

Holotype male. Victoria, Little River, 6 km E of Wulgulmerang, 12 Dec 1976, A. Neboiss (NMV, T-10110).

New material examined. Victoria. 1 male, Yea R., Westbridge Rd, 4.8 km S of Glenburn, 29 Nov 2007, Cartwright (NMV TRI-57925); 1 male, Eurobin Ck, Mt Buffalo Rd, 36.7179° S, 146.8416° E, 485 m, 22 Nov 2024, R. St Clair (NMV TRI-57957); 1 male (DC 266), Staceys Bridge, Nariel Ck, Nariel, S of Corryong, 36° 27' S, 147° 49' E, 6 Feb 2013, D. Cartwright (NMV TRI-58362); 1 male (DC 002), Staceys Ck, 50m u/s Nariel Ck jn, Staceys Bridge, 10 Feb 2011, D. Cartwright (NMV TRI-58336); New South Wales. 1 male, Nungatta Ck, Imlay Rd bridge, 37.13° S, 149.35° E, 22 Nov 2014, D. Cartwright (NMV TRI-58239); 1 male, Cockerawo Ck, 23 km WNW Bellangry, 730 m, 8 Dec 1986, G. Theischinger (NMV TRI-58231); 3 males, Orara West State Forest, Tuckers Knob, 29° 41' S, 152° 48' E, 22 Nov 1990, G. Theischinger (NMV TRI-58216); 1 male (DC 073), Dilgry R., Banksia campground, 31° 53' S, 151° 32' E, 2 Dec 2007, A. Glaister, J. Dean and R. St Clair (NMV TRI-58343).

Remarks. This slightly variable species is recorded from eastern Vic and eastern NSW (Cartwright, 1990).

Ecnomus digrutus Cartwright

Ecnomus digrutus Cartwright, 1990: 9, figs 12, 13.

Holotype male. Western Australia, Fine Springs Ck on road between L. Argyle tourist village and Duncan Hwy, 23 Feb 1977, J.E. Bishop (NMV, T-10043).

New material examined. Northern Territory. 1 male (DC 304), Radon Springs, 12.7515° S, 132.903° E, 24 Apr 2015, P. Dostine (NMV TRI-58356); 1 male, Kakadu NP, Little Baroalba Ck, UV, 12° 48' S, 132° 49' E, 25–26 Apr 1991, Wells and Webber (NMV TRI-58313); 1 male, Baroalba Springs, 12° 48' S, 132° 49' E, MV, 4 Oct 1991, A. Wells (NMV TRI-58312); 1 male, Kakadu NP, Jim Jim Falls campsite, 13° 16' S, 132° 49' E, 13 Aug 1996, I. Edwards (NMV TRI-58311). Queensland (Cape York Peninsula), 2 males, Bamaga (ex *Culicoides* trap, cattle watering dam), 21 Aug 2009, J. Bond (ANIC); 2 males, Bamaga (ex *Culicoides* trap, airport piggery), 21 Sep 2009, J. Bond (ANIC).

Remarks. Cartwright (1990) described this as a rare northern Australian species, previously restricted to the Kimberley Region of northern WA and NT, but here recorded from NE Qld for the first time.

Ecnomus jimba Cartwright

Ecnomus jimba Cartwright, 1990: 7, figs 5, 6.

Holotype male. Western Australia, Ord River, 9 km N Kununurra, 19 Sep 1979, J. Blyth (NMV, T-10018).

New material examined. Western Australia. 1 male, Carlton Hill via Kununurra, 17–20 Aug 2009, L. Halling (ex *Culicoides* trap) (ANIC); 2 males (DC 123/189), Kimberley, Pentecoste R, El Questro Caravan Park, “pool”, 18 Aug 2011, D. Cartwright (NMV TRI-58319/58354); 1 male, El Questro Stn, Chamberlain R. pool, 15° 58' S, 127° 56' E, 26 Aug 1996, I. Edwards (NMV TRI-57868).

Remarks. A common northern Australian species recorded from Kimberley Region, N WA and NT (Cartwright, 1990).

Ecnomus kakaduensis Cartwright

Ecnomus kakaduensis Cartwright, 1990: 10, figs 16, 17.

Holotype male. Northern Territory, Radon Ck, Kakadu Nat. Pk, 3 Sep. 1979, J. Blyth (NMV, T-10055).

New material examined. Western Australia. 1 male, Drysdale R. upper reaches, 16° 09' S, 125° 58' E, 7 Sep 1996, I. Edwards (NMV TRI-58275).

Remarks. An uncommon northern Australian species recorded from Kimberley Region of northern WA and NT (Cartwright, 1990).

Ecnomus karrawalla Cartwright

Ecnomus karrawalla Cartwright, 1990: 22, figs 63, 64.

Holotype male. Victoria, Wannon River, Nigretta Falls, 6 Dec 1983, A. Neboiss (NMV, T-10202).

New material examined. 1 male (EPAVT189), Vic, SW1, Glenelg River, Sandford–Bahgallah Rd, site JKN, 15 Oct 2013, EPA (NMV TRI-58363).

Remarks. Originally only one male was known from the type locality in SW Vic (Cartwright, 1990), more recently a second male was collected from a nearby site.

Ecnomus kerema Cartwright

Ecnomus kerema Cartwright, 1990: 17, figs 43, 44.

Holotype male (CT-103). Queensland, Yuccabine Ck, Kirrama State Forest, 18° 12' S, 154° 45' E, Feb 1986, R. Pearson and L. Benson (NMV, T-10164).

New material examined. Queensland. 1 male (CT-672/DC 351), ck at Bridge 8, Kirrama Range Rd, 3 km from NP sign, 18.1957° S, 145.8687° E, 260 m, 24 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-58351); 1 male (DC 376), Rykers Ck on Bloomfield Rd, 2 km N of Cape Tribulation, 16.072° S, 145.4624° E, 95 m, 29 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-58334).

Remarks. *Ecnomus kerema* was originally known from only one male (Cartwright 1990) but is now recorded from three sites in NE Qld.

Ecnomus kinka Cartwright

Ecnomus kinka Cartwright, 1990: 24, figs 73, 74.

Holotype male. Western Australia, Morgan River, Theda H.S., Kimberleys, 28 Sep 1979, J. Blyth (NMV, T-10220).

New material examined. Western Australia. 1 male (DC 154), Kimberley, Kununurra, Kimberleyland Caravan Park, lake foreshore, 16 Aug 2011, D. Cartwright (NMV TRI-58358); 4 males, Purnululu NP, Blue Holes, Ord R., 17° 35' S, 128° 15' E, 7 Oct 1996, I. Edwards (NMV TRI-58280); 1 male, Moll Gorge, Hann R., 16° 58' S, 125° 59' E, 15 Sep 1996, I. Edwards (NMV TRI-58277); 13 males, Geikie Gorge, 18° 06' S, 125° 42' E, 5 Oct 1996, I. Edwards (NMV TRI-58286); 6 males, El Questro Stn, Chamberlain R. pool, 15° 58' S, 127° 56' E, 26 Aug 1996, I. Edwards (NMV TRI-57935). Northern Territory. 3 males, Negri R., Duncan Hwy, 17° 05' S, 129° 01' E, 18 Aug 2007, D. Cartwright and J. Giblin (NMV TRI-58293); 1 male, Litchfield NP, Florence falls, 13° 03' S, 130° 47' E, MV light, 6 Jun 1991, Wells and Webber (NMV TRI-58310). Queensland. 1 male (DC 054), N Kennedy R. nr Hann R. xing, Lakefield NP, 13 Aug 2009, D. Cartwright (NMV TRI-58341).

Remarks. *Ecnomus kinka* is recorded from the Kimberley Region of northern WA, NT and NE Qld (Cartwright, 1990).

Ecnomus kitabal Cartwright

Ecnomus kitabal Cartwright, 1990: 7, figs 3, 4.

Holotype male. New South Wales, Clarence River at Yates crossing, 26 Oct 1981, Wells and Carter (NMV, T-10003).

New material examined. Western Australia. Many males, Pilbara, De Grey R., Great Northern Hwy bridge, 20° 18' S, 119° 15' E, 6 Sep 2007, D. Cartwright and J. Giblin (NMV TRI-58283/58290); 8 males, Geikie Gorge, 18° 06' S, 125° 42' E, 5 Oct 1996, I. Edwards (NMV TRI-58284). Northern Territory. 3 males, Negri R., Duncan Hwy, 17° 05' S, 129° 01' E, 18 Aug 2007, D. Cartwright and J. Giblin (NMV TRI-58291).

Remarks. Distribution from Kimberley Region of northern WA, eastern Qld and NE NSW (Cartwright, 1990) and more recently from the northern Pilbara region of WA.

Ecnomus larakia Cartwright

Ecnomus larakia Cartwright, 1990: 25, figs 77, 78.—Cartwright, 1998: 77, figs 9, 10.

Holotype male. Northern Territory, Howard Springs, 9 Sep 1980, D. King (NMV, T-10233).

New material examined. Australia, Queensland. 4 males, Bamaga (ex *Culicoides* trap, cattle watering dam), 21 Aug 2009, J. Bond (ANIC); 1 male, Bamaga (ex *Culicoides* trap, airport piggery), 21 Sep 2009, J. Bond (ANIC); 1 male, Bamaga (ex *Culicoides* trap, airport paddock), 19 Oct 2009, J. Bond (ANIC); many males, Ross R., River Walk, Townsville, 19.321° S, 146.729° E, 20 m, 20 Oct 2017, D. Cartwright

(NMV TRI-58302). Northern Territory. 5 males, Cooinda, Kakadu NP, 12° 54' S, 132° 31' E, 11 Aug 1996, I. Edwards (NMV TRI-58527). Western Australia. 3 males (CT-741, DC 156/190), Kimberley, Kununurra, Kimberleyland Caravan Park, lake foreshore, 16 Aug 2011, D. Cartwright (NMV TRI-58324/58326/58529); 4 males, Lake Kununurra, Kununurra, 15° 47' S, 128° 44' E, 20 Aug 2007, D. Cartwright (NMV TRI-58295).

Remarks. Found from Kimberley Region of northern WA, NT and NE Qld (Cartwright, 1990) and NE Papua New Guinea (Cartwright, 1998). The new records extend the distribution to the tip of Cape York Peninsula in N Qld.

Ecnomus miriwud Cartwright

Ecnomus miriwud Cartwright, 1990: 21, figs 59, 60.

Holotype male. Western Australia, Spillway Ck, 2 Feb 1978, J.E. Bishop (NMV, T-10184).

New material examined. Western Australia. 2 males, Purnululu NP, Blue Holes, Ord R., 17° 33' S, 128° 15' E, 7 Oct 1996, I. Edwards (NMV TRI-58281). Queensland. 1 male (DC 052), N Kennedy R. nr Hann R. xing, Lakefield NP, 13 Aug 2009, D. Cartwright (NMV TRI-58344); 1 male (DC 104), Adele Grove, Lawn Hill Gorge, 11 Aug 2011, D. Cartwright (NMV TRI-58328); 5 males (CT-732), Barron R., Lake Placid outlet, Cairns, 16.8689° S, 145.4622° E, 62 m, 30 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-57533/57913); 2 males, Lake Placid, 100 m u/s Barron R. outlet, Cairns, 16.8681° S, 145.6727° E, 80 m, 31 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-57911).

Remarks. Widespread northern Australian distribution from Kimberley Region of northern WA, NT and NE Qld. Only one previous record from Qld from Hann River Crossing, north of Laura (Cartwright, 1990); more recently in this study the species was recorded from four other sites in NE Qld.

Ecnomus pakadji Cartwright

Ecnomus pakadji Cartwright, 1990: 25, figs 79, 80.

Holotype male. Queensland, Iron Range, West Claudie River, 17 Sep 1974, M.S. Moulds (NMV, T-10245).

New material examined. Queensland. 2 males (DC 051), Cape York Peninsula, Iron Range, Gordon Ck, 3 Aug 2009, D. Cartwright (NMV TRI-58298/58347).

Remarks. The two new specimens recorded here from near the type locality are the first since the holotype was collected (Cartwright, 1990).

Ecnomus pansus Neboiss

Ecnomus pansus Neboiss, 1982: 288, figs 21–23.—Neboiss, 1986: 150.—Cartwright, 1990: 16, figs 39, 40, 87, 88.

Holotype male. Western Australia, Frankland River, Circular Pool, 6 km NE of Walpole, 27 Nov 1978, A. Neboiss (NMV, T-6165).

New material examined. Queensland. 2 males (DC 096, DC 097), SW, Eyre Ck about 25 km N Betoota, 9 Aug 2011, D. Cartwright (NMV TRI-58304/58350). New South Wales. 1 male (MS 1283), 1 female (MS 1248), Murrumbidgee R. at Gundagai, 35.074° S, 147.106° E, 10 Apr 2011, P. Suter, J. Webb and J. Hawking (NMV TRI-58238/58270). Victoria. 7 males, Murray R. d/s Hume weir, 9 May 1987, A. Glaister (NMV TRI-58234); 2 males (DC 092), Yea R., Glenburn, 29 Nov 2007, D. Cartwright (NMV TRI-57929/58340); 1 male, Campaspe R.,

S of Kyneton, 37.2447° S, 144.4441° E, 21 Jan 2021, D. Cartwright (NMV TRI-57953); 1 male, Coliban R. nr Lauriston, W of Kyneton, 37.2390° S, 144.3713° E, 25 Jan 2021, D. Cartwright (NMV TRI-57952). Western Australia. 1 male, Kaglan R., 20 km NE of Albany, 3 Nov 1989, K. Walker (NMV TRI-58236).

Remarks. *Ecnomus pansus* is a common and widespread species, recorded from southern WA, SA, Vic, NSW, Qld and NT (Cartwright, 1990).

Ecnomus pilbarensis Cartwright

Ecnomus pilbarensis Cartwright, 1990: 24, figs 75, 76.

Holotype male. Western Australia, Wittenoom Gorge, 10 km E of Roebourne Rd, Pilbara, 24 Oct 1979, J. Blyth (NMV, 10227).

New material examined. Western Australia. 11 males (DC 094), De Grey R., Great Northern Hwy bridge, 20° 18' S, 119° 15' E, 6 Sep 2007, D. Cartwright and J. Giblin (NMV TRI-58278/58288/58338); 1 male, Moll Gorge, Hann R., 16° 58' S, 125° 59' E, 15 Sep 1996, I. Edwards (NMV TRI-58241); 1 male (DC 152), Kimberley, Kununurra, Kimberleyland Caravan Park, lake foreshore, 16 Aug 2011, D. Cartwright (NMV TRI-58330); 3 males, Purnululu NP, Blue Holes, Ord R., 17° 33' S, 128° 15' E, 7 Oct 1996, I. Edwards (NMV TRI-57864). Northern Territory. 5 males (DC 116, DC 274), 1 female (DC 117), trib. Negri R., “Lester” overgrown track, 15 Aug 2011, D. Cartwright (NMV TRI-57869/58315/58318/58357).

Remarks. *Ecnomus pilbarensis* is a widespread northern Australian species, recorded from Pilbara and Kimberley Regions of northern WA, NT and NE Qld (Cartwright, 1990).

Ecnomus russellius Neboiss

Ecnomus russellius Neboiss, 1977: 56, figs 250–254.—Cartwright, 1990: 22, figs 65, 66, 83, 84.—Neboiss, 2002 (2003): 63, figs 14H, I, 15A, B.

Holotype male. Tasmania, Russell Falls Nat. Pk, 20 Feb 1967, Neboiss (NMV, T-4854).

New material examined. Tasmania. Many males, females, Sandfly Ck at Scotts Peak Rd, MV-light, 42° 54' S, 146° 22' E, 9 Feb 1988, K. Walker and J. Jackson (NMV TRI-58309); 2 males, Tyenna R. at Russell Falls Cottages, 42.6816° S, 146.7208° E, 11 tr., 31 Jan 2015, R. St Clair (NMV TRI-58224, 58235); 1 male, Middlesex Stn Ck at crossing on Cradle Mt Rd (C132), Middlesex, 41.544° S, 145.994° E, 5 Jan 2012, J. Mynott and M. Shackleton (NMV TRI-58232). Victoria. 1 male, Gellibrand R at Asplin Ck jn, 26 Jan 1982, A. Neboiss (NMV TRI-58212); 1 male, Kennett R., 0.5 km u/s Great Ocean Rd, Otways, 38° 40' S, 143° 52' E, 24 Jan 2012, D. Cartwright (NMV TRI-58226); 9 males, Campaspe R., S of Kyneton, 37.2554° S, 144.4535° E, 23 Jan 2021, D. Cartwright (NMV TRI-57955); 1 male (DC 254), Delatite R., Mirimbah nr Mt Buller, 37° 07' S, 146° 24' E, 17 Jan 2013, D. Cartwright (NMV TRI-58335). NSW. 2 males, Jerusalem Falls nr Karuah, 6 Dec 1988, G. Theischinger (NMV TRI-58214); 2 males, Sharpes Ck jn Gloucester R., Barrington Tops, 2 Oct 2008, D. Cartwright (NMV TRI-57923); 1 male (MS 1242), Coppernook Ck on bend, 30.29255° S, 152.8178° E, 26 Feb 2011, J. Mynott & M. Shackleton (NMV TRI-58271); 1 male, Genoa R, 1.5 km along Imlay Rd, 37° 08' S, 149° 21' E, 2 Feb 2012, D. Cartwright (NMV TRI-58220); 1 male (DC 171), trib. Nungatta Ck, 1km N Mountain View Track, 37° 10' S, 149° 28' E, 2 Feb 2012, D. Cartwright (NMV TRI-58316). Queensland. 3 males, 5 females, Morans Ck above Morans Falls, Lamington Nat. Pk, 28.226° S, 153.129° E, 16 Nov 2011, J. Mynott and M. Shackleton (NMV TRI-57922); 15 males, Morans Ck, above falls, Lamington NP, 28.2322° S, 153.1266° E, 6 Nov 2017, D. Cartwright and R. St Clair (NMV TRI-58229, 58240); 2 males, 1 female, Saddle Tree Ck just

above Festoon Falls, Bunya Mts NP, 26.259° S, 151.602° E, 23 Nov 2011, J. Mynott and M. Shackleton (NMV TRI-57924).

Remarks. A common species, widespread throughout Tas, and recorded from Vic, eastern NSW and SE Qld (Cartwright, 1990).

Ecnomus tillyardi Mosely

Ecnomus tillyardi Mosely in Mosely and Kimmins, 1953, 378, fig. 260.—Neboiss, 1977: 55, figs 243–249.—Cartwright, 1990: 14, figs 34, 34a, 103, 104.—Neboiss, 2002 (2003): 63, figs 14D, E, 15E, F.

Holotype male. Tasmania, Cradle Mt, 22 Jan 1917, J.W. Evans (BMNH).

New material examined. Tasmania. Many males, females, Sandfly Ck at Scotts Peak Rd, MV-light, 42° 54' S, 146° 22' E, 9 Feb 1988, K. Walker and J. Jackson (NMV TRI-58309); 1 male, Adams R. at Adams falls, 42° 43' S, 146° 18' E, MV-light, 8 Feb 1988, A. Neboiss and K. Walker (NMV TRI-58306); 3 males (DC 271), 5 females, Hellyer R. at Hellyer R. Gorge, 41.273° S, 145.614° E, 4 Jan 2012, J. Mynott and M. Shackleton (NMV TRI-57917/58217). Victoria. 10 males, 2 females, Gellibrand R. u/s Carlisle R. jn, 27 Dec 2005, D. Cartwright (NMV TRI-58221); 1 male (DC 246), Barwon R., Merriwarp Rd, W of Geelong, 38° 14' S, 144° 26' E, 6 Oct 2013, D. Cartwright (NMV TRI-58360); 2 males (DC 245, DC 279), same loc. and collector, 18 Nov 2013 (NMV TRI-57920/58355); 2 males, same loc. and collector, 24 Oct 2019 (NMV TRI-58225); 2 males, same loc. and collector, 18 Feb 2021 (NMV TRI-57946); 1 male (DC 249), Barwon R., Buckleys Falls, Geelong, 38° 15' S, 144° 31' E, 1 Dec 2013, D. Cartwright (NMV TRI-58359); 1 male, Coliban R. nr Lauriston, W of Kyneton, 37.2390° S, 144.3713° E, 25 Jan 2021, D. Cartwright (NMV TRI-57951); 2 males (DC 244, DC 269), Yarra R., Yering Gorge, 37° 42' S, 145° 33' E, 27 Nov 2013, D. Cartwright (NMV TRI-57921/58333); 1 male, 3 females, Badger Ck, Don Rd, 2 Dec 2003, D. Cartwright (NMV TRI-57928); 3 females, Grace Burn, Wallace Pde, UV It, 2 Dec 2003, D. Cartwright (NMV TRI-57927); 1 male, Little Yarra R., Lowes Rd, Yarra Junction, 37.7808° S, 145.6202° E, 30 Nov 2021, D. Cartwright (NMV TRI-57945); 3 males, Yarra R., OShannassy Rd, UV, 3 Dec 2003, D. Cartwright (NMV TRI-57931); 3 males, same loc. and collector, 1 Dec 2005 (NMV TRI-58223); 1 male, Yarra R., Reefton Rd, 1 Dec 2005, D. Cartwright (NMV TRI-58215); 2 males (DC 269), 2 females, Yea R., Glenburn, 29 Nov 2007, D. Cartwright (NMV TRI-57932); 5 males, Hughes Ck, site 4, light trap, 6–7 Jan 2015, J. Lancaster and B. Downes (NMV TRI-58194); 2 males (DC 078), Mitta Mitta R. off Frasers Track, Alpine NP, 36.47788° S, 147.40463° E, 28 Jan 2010, J. Hawking, J. Mynott and M. Shackleton (NMV TRI-57930). New South Wales. 1 male, Genoa R., 1.5 km along Imlay Rd, 37° 08' S, 149° 21' E, 2 Feb 2012, D. Cartwright (NMV TRI-57926).

Remarks. A variable and common species distributed throughout Tas, SE SA, Vic, E NSW (Cartwright, 1990).

Ecnomus tridigitus Cartwright

Ecnomus tridigitus Cartwright, 1990: 11, figs 20, 21, 91, 92.

Holotype male. New South Wales, Bellinger River, 30° 26' S, 152° 44' E, 31 Oct 1981, Wells and Carter (NMV, T-10070).

New material examined. Queensland. 7 males, Lake Placid, 100 m u/s Barron R. outlet-16.8681° S, 145.6727° E, 80 m, 31 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-57919/58297); 2 males (CT-682/DC 350), Barron R., Lake Placid outlet, Cairns, 16.8689° S, 145.4622° E, 62 m, 30 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-58299/58352).

Remarks. *Ecnomus tridigitus* was previously recorded from E NSW and SE Qld (Cartwright 1990). The known range is now extended north (to about 17°S), with the 9 males recorded from two sites in NE Qld.

Ecnomus turgidus Neboiss

Ecnomus turgidus Neboiss, 1982: 289, fig. 20;—Cartwright, 1990: 8, figs 10, 11, 97, 98. — Neboiss, 2002 (2003): 63, figs 14D, E, 15E, F.

Holotype male. Western Australia, Serpentine River below Serpentine Falls, 20 Sep 1978, A. Neboiss (NMV, T-6194).

New material examined. Victoria. 2 males, Campaspe R., S of Kyneton, 37.2554° S, 144.4535° E, 23 Jan 2021, D. Cartwright (NMV TRI-57958); 2 males (DC 091), Yea R., Glenburn, 29 Nov 2007, D. Cartwright (NMV TRI-58305/58522); 2 males, 1 female, Tarago R, up site, 11 Jan 2022, J. Lancaster and B. Downes (NMV TRI-58195); 1 male, Sale Common NCR, Sale, 38.1266° S, 147.0747° E, light trap, 28 Feb 2013, Z. Billingham (NMV TRI-58523).

Remarks. Originally recorded from southwest WA, SA, Vic, Qld (Cartwright, 1990) and more recently from SW Tas (Jackson, 2000; Neboiss, 2003).

Ecnomus turrbal Cartwright

Ecnomus turrbal Cartwright, 1990: 12, figs 24, 25.

Holotype male. Queensland, Brisbane River nr Kholo, 9 Mar 1973, M.H. Colbo (NMV, T-10085).

New material examined. Queensland. 3 males (DC 366), Lake Placid, 100 m u/s Barron R. outlet, 16.8681° S, 145.6727° E, 80 m, 31 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-58301/58353); 2 males, Barron R., Lake Placid outlet, Cairns, 16.8689° S, 145.4622° E, 62 m, 30 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-58300).

Remarks. A widespread northern Australian species distributed from E Qld to the NT (Cartwright, 1990).

Ecnomus veratus Cartwright

Ecnomus veratus Cartwright, 1990: 8, figs 7–9.

Holotype male. Northern Territory, Groote Eylandt, Amagule Pool, 6 Feb 1984, M. Davies (NMV, T-10039).

New material examined. Western Australia. 1 male, King Edward R., 14° 54' S, 126° 12' E, 3 Sep 1996, I. Edwards (NMV TRI-58287). Queensland. 6 males, Wenlock R., Morton Telegraph Stn (Cape York Peninsula), 4 Aug 2009, D. Cartwright (NMV TRI-57914).

Remarks. A unique widespread northern Australian species distributed from the Kimberley Region of northern WA, NT and NE Qld. Previously only two males were recorded from NE Qld, from Hann River Crossing, N of Laura and Marina Plains (Cartwright 1990).

Ecnomus volsellus Cartwright

Ecnomus volsellus Cartwright, 1990: 15, figs 36–38, 105, 106.

Holotype male. Victoria. Genoa R. nr Wangarabell, 18 Mar 1977, A. Neboiss (NMV, T-10142).

New material examined. Victoria. 1 male, Angusvale campground, Cobbannah, 37.5900° S, 147.3522° E, 24 Nov 2014, Z. Billingham (NMV TRI-58233). New South Wales. 8 males, Engadine, 5 Oct 1986, G. Theischinger (NMV TRI-58230); 3 males, same loc. and collector,

28 Dec 1986 (NMV TRI-58237); 1 male, 3 females, Allyn R. by the Allyn Riverside Cabins, 32.1879° S, 151.5029° E, 6 Nov 2018, Z. Billingham (NMV TRI-58227); 1 male (DC 045), Wilson R., Bobs Ridge Rd, 31° 15' S, 152° 31' E, 4 Dec 2007, A. Glaister, J. Dean and R. St Clair (NMV TRI-58346). Queensland. 20 males, 8 females, Carnarvon Gorge Nat. Park, 25° 15' S, 148° 24' E, 12 Nov 1990, G. Theischinger (NMV TRI-57915).

Remarks. *Ecnomus volsellus* has been recorded from E Vic to about latitude 28° S in SE Qld (Cartwright 1990); newer records from Carnarvon Gorge extend the distribution north to about 25° S.

Ecnomus wagengugarra Cartwright

Ecnomus wagengugarra Cartwright, 1990: 21, figs 61, 62.

Holotype male. New South Wales. Clarence River at Yates Crossing, 26 Oct 1981, Wells and Carter (NMV, T-10200).

New material examined. Queensland. 1 male (DC 386/ CT-728), Barron R., Lake Placid outlet, Cairns, 16.8689° S, 145.462° E, 62 m, 30 Oct 2017, D. Cartwright and R. St Clair (NMV TRI-58535); 1 male (DC 388/ CT-730), Mulgrave R., Goldsborough Valley campsite, Wooroonooran NP, 17.2374° S, 145.7733° E, 128 m, 26 Oct 2017, D. Cartwright and R. St Clair (all NMV TRI-58536).

Remarks. Males have been collected from two widely separated areas in northern NSW and north-eastern Qld (Cartwright, 1990).

Ecnomus wellsae Cartwright

Ecnomus wellsae Cartwright, 1990: 10, figs 18, 19, 101, 102.

Holotype male. New South Wales. Severn River, 29° 28.3' S, 151° 29' E, 23 Oct 1981, Wells and Carter (NMV, T-10058).

New material examined. NSW. 5 males (DC 060), Wilson R., Bobs Ridge Rd, 31° 15' S, 152° 31' E, 4 Dec 2007, A. Glaister, J. Dean and R. St Clair (NMV TRI-58222/58348). Qld. 25 males, 3 females, Carnarvon Gorge Nat. Park, 25° 15' S, 148° 24' E, 12 Nov 1990, G. Theischinger (NMV TRI-57916); 1 male, Davies Ck Rd, SE of Mareeba, 27 Nov 1981, R.I. Storey (NMV WTH-0984/TRI-58296).

Remarks. *Ecnomus wellsae* has been recorded from north-eastern NSW and E Qld (Cartwright 1990).

Ecnomus woronan Cartwright

Ecnomus woronan Cartwright, 1990: 9, figs 14, 15.

Holotype male. Western Australia, Camp Ck at crusher, Mitchell Plateau, 15 Feb 1979, J.E. Bishop (NMV, T-10046).

New material examined. Queensland. 3 males (DC 049), Wenlock R., Morton Telegraph Stn, 4 Aug 2009, D. Cartwright (NMV TRI-57912/58339); 1 male (atypical), Bamaga (ex *Culicoides* trap, airport piggery), 21 Sep 2009, J. Bond (ANIC); 1 male (DC 103), Adele Grove, Lawn Hill Gorge, 11 Aug 2011, D. Cartwright (NMV TRI-58342).

Remarks. A slightly variable widespread northern Australian species distributed from Kimberley Region of northern WA, NT and NE Qld. Only two males were recorded previously from the Mt Spec area of NE Qld, (Cartwright, 1990). The new records extend the distributional range to Cape York Peninsula and NW Qld.

Ecnomus yabbura Cartwright

Ecnomus yabbura Cartwright, 1990: 20, figs 57, 58.

Holotype male. Western Australia, Morgan River, Theda H.S., Kimberleys, 28 Sep 1979, J. Blyth (NMV, T-10182).

New material examined. Northern Territory. 1 male, Negri R., Duncan Hwy, 17° 05' S, 129° 01' E, 18 Aug 2007, D. Cartwright and J. Giblin (NMV TRI-58272). Western Australia. 1 male, Drysdale R. NP via Carson River Stn, 14° 37' S, 126° 56' E, 31 Aug 1996, I. Edwards (NMV TRI-58276); 1 male, King Edward R., 14° 54' S, 126° 12' E, 3 Sep 1996, I. Edwards (NMV TRI-58279); 4 males, Kimberley, Manning Gorge, Mt Barnett Stn, 16° 39.27' S, 126° 55.41' E, 30 Apr 1992, P.S. Cranston (NMV TRI-57862); 1 male (DC 122), Kimberley, Pentecoste R, El Quaestro Caravan Park, "pool", 18 Aug 2011, D. Cartwright (NMV TRI-58322); 1 male, El Questro Stn, Chamberlain R. pool, 15° 58' S, 127° 56' E, 26 Aug 1996, I. Edwards (NMV TRI-57936).

Remarks. This species is recorded from the Kimberley Region of northern WA and NT (Cartwright, 1990).

Acknowledgements

I am indebted to my wife Lindy and our family for their great moral and financial support for my caddis work; to Jeff Giblin, Wayne Mundy, Peter and Nikki Lester and Ken Guyett for their friendship and driving support on 4WD adventures and collecting expeditions to the far reaches of Australia, and to Ros St Clair for outstanding support and company on our relatively recent 2017 collecting trip to Queensland. Many specimens were collected under Queensland NP permit no. WITK15549915 (The Entomological Society of Queensland). I also thank Alice Wells for her valuable comments on an earlier draft of this manuscript, and Michael Shackleton for facilitating the loans of specimens.

References

- Cartwright, D.I. 1990. The Australian species of *Ecnomus* McLachlan (Trichoptera: Ecnomidae). *Memoirs of the Museum of Victoria* 51: 1–48. <https://doi.org/10.24199/j.mmv.1990.51.01>
- Cartwright, D.I. 1997. Preliminary key to the identification of late instar larvae of Australian Ecnomidae, Philopotamidae and Tasmidae [Tasimidae] (Insecta: Trichoptera). *Co-operative Research Centre for Freshwater Ecology Identification Guide* 10: 1–33.
- Cartwright, D.I. 1998. New species and a new record of *Ecnomus* McLachlan (Trichoptera: Ecnomidae) from Papua New Guinea and Irian Jaya. *Memoirs of the Museum of Victoria* 51: 1–48. <https://doi.org/10.24199/j.mmv.1998.51.05>
- Cartwright, D.I. 2011. Replacement name for a species of Australian *Ecnomus* (Trichoptera: Ecnomidae). *Braueria* 38: 12.
- Cartwright, D., Wells, A., Dean, J., St Clair, R., and Shackleton, M. 2023. Taxonomic status and distribution of Australian caddisflies (Insecta: Trichoptera). *Memoirs of Museum Victoria* 82: 97–117. <https://doi.org/10.24199/j.mmv.2023.82.05>
- Jackson, J. 2000. Threatened Trichoptera (Caddisflies) from the Tasmanian Wilderness World Heritage Area. *Papers and Proceedings of the Royal Society of Tasmania* 134, 55–62. <https://doi.org/10.26749/rstpp.134.55>
- Li, Y.J., and Morse, J.C. 1997. Species of the genus *Ecnomus* (Trichoptera: Ecnomidae) from the People's Republic of China. *Transactions of the American Entomological Society*. 23:85–134.

- McLachlan, R. 1864. On the trichopterous genus *Polycentropus* and the allied genera. *Entomologist's Monthly Magazine* 1: 25–31.
- Morse, J.C. (ed.) 2026. *Trichoptera world checklist*. Available from: <http://entweb.clemson.edu/database/trichopt/index.htm> (accessed 26 Jan 2026).
- Mosely, M.E., and Kimmins D.E. 1953. *The Trichoptera (Caddis-flies) of Australia and New Zealand*. British Museum (Natural History), London, 550 pp. <https://doi.org/10.5962/bhl.title.118696>
- Neboiss, A. 1977. A taxonomic and zoogeographic study of Tasmanian caddis-flies (Insecta: Trichoptera). *Memoirs of Museum Victoria* 38: 1–208. <https://doi.org/10.24199/j.mmv.1977.38.01>
- Neboiss, A. 1978. A review of caddis-flies from three coastal islands of south-eastern Queensland (Insecta: Trichoptera). *Australian Journal of Marine and Freshwater Research*, 29, 825–843. <https://doi.org/10.1071/MF9780825>
- Neboiss, A. 1982. The caddis-flies (Trichoptera) of south-western Australia. *Australian Journal of Zoology*, 30, 271–325. <https://doi.org/10.1071/ZO9820271>
- Neboiss, A. 1986. *Atlas of Trichoptera of the SW Pacific — Australian region*. Dr W Junk: Dordrecht. 286 pp. <https://doi.org/10.1007/978-94-009-4814-3>
- Neboiss, A., 2002 (publ. 2003). New genera and species, and new records, of Tasmanian Trichoptera (Insecta). *Papers and Proceedings of the Royal Society of Tasmania* 136: 43–82. <https://doi.org/10.26749/rstpp.136.43>
- Rambur, P.J. 1842. *Histoire Naturelle des Insectes*. Nèvroptères, Paris, 534 pp. + 12 pls.
- Shackleton, M., St Clair, R., Dean, J. and Cartwright, D.I. (in prep.). The state of taxonomy of Australian Trichoptera with emphasis on new molecular findings.
- Suter, P., Dean, J. Cartwright, D., Sutcliffe, K., Davies, P., Pinder, A., and Bryce, C. 2006. *Habitat profiles of selected Australian aquatic insects*. Australian government of the Environment, Water, Heritage and the Arts, Canberra. Accessed at www.environment.gov.au/biodiversity/abrs/publications/electronic-books/aquatic-insects.html
- Ulmer, G. 1916. Results of Dr. E. Mjöberg's Swedish Scientific expedition to Australia 1910-1913, 'Trichoptera'. *Arkiv för Zoologi* 10, 1–23. <https://doi.org/10.5962/bhl.part.1501>